**IODP Expedition 362: Sumatra Seismogenic Zone**
**Week 6 Report (11–17 September 2016)**

## OPERATIONS

Week 6 of Expedition 362 (Sumatra Seismogenic Zone) began while we were pulling the drill string to the surface from a depth of 3830.3 m below rig floor after installing a reentry system. Very early on 11 September 2016, smoke and noise were discovered coming from the aft drawworks Elmagco (eddy current) brake. Operations resumed after the brake was decoupled, and the rest of the drill string was pulled to the surface, with the casing running tool reaching the rig floor at 0630 h. The mud motor, underreamer, and drill bit were flushed with water and disassembled by 1115 h, and it was noted that one of the underreamer cones was missing and presumed lost in the hole. The rig floor was secured for transit at 1300 h, the acoustic beacon was recovered at 1103 h, and the hydrophones were raised in preparation for transit. However, the vessel remained on site while the damage to the Elmagco brake was assessed. The thrusters were raised at 2030 h and the *JOIDES Resolution* began the transit to Singapore to make the necessary repairs to the brake. During the transit, the failed brake was removed from the drawworks and secured on the rig floor. The 996 nmi transit was completed in 83.4 h at an average speed of 11.9 kt. The vessel docked at the Loyang Offshore Terminal at 1106 h on 15 September, and the failed brake was sent to the repair facility soon after arrival. The replacement brake was delivered to the vessel at 2100 h on 15 September. The coupling from the failed brake was installed on the new brake on 16 September, and the brake was aligned and tested on 17 Saturday. At the end of the week the vessel was preparing to depart on 18 September.

## SCIENCE RESULTS

Laboratory teams finished analyzing the Site U1480 data and worked on their site reports.

### Sedimentology and Petrology

We reviewed lithologic units to reconcile differences between unit boundaries defined based on our lithologic observations and physical properties data. Some additional cores were sampled for a detailed, shore-based lithologic and magnetic mineral study.

### Structural Geology

We synthesized our existing observations and started thinking about their significance in the broader context of the strength of the recovered sequence. Analysis of drilling performance data

reveals a progressive strengthening with depth although there are significant deviations and jumps in this progression. Strength variability in lithologic Subunit IIC appears more complex and variable than in the underlying units. Intervals with minimal drilling disturbance have also been identified. Further correlation of drilling disturbance and coring parameters with other measured properties may help yield new insights.

**Biostratigraphy**

We took additional samples for shipboard and shore-based analyses. The shipboard samples were used to constrain the interval that contains the Cretaceous/Paleogene boundary.

**Paleomagnetism**

We finished measuring discrete samples from the deepest cores in Hole U1480G, and also measured the archive-half core sections from Core U1480B-1H, which was split toward the end of Site U1480 operations. The declination record from Hole U1480B is in agreement with the corresponding records from Holes U1480E and U1480H. To fully characterize a series of highly magnetic mudstone layers in Core U1480G-38R, we demagnetized a few additional discrete samples and the results confirmed that greigite is the magnetic carrier. We also continued to investigate oriented declination datasets obtained with data from the IceField and FlexIt orientation tools.

**Geochemistry**

We finalized analyses of samples from Holes U1480G (minor elements) and U1480H (major elements and organic metabolites). Data from high-resolution sampling at Hole U1480H provide a better view of the biogeochemical processes active within the upper 150 m, and will serve as the basis for interpretation of microbial data. Analyses of total carbon, total nitrogen, and inorganic carbon were also completed.

**Physical Properties**

We continued to work on our Site U1480 report, with emphasis of understanding how physical properties changes correlated with lithostratigraphic units.

**Core-Log-Seismic Integration**

Our results from Site U1480 and potential future sites were compared to older single channel seismic data in the region.

## EDUCATION AND OUTREACH

We conducted 18 broadcasts with schools and universities in Australia, France, India, the United Kingdom, and the USA. We maintained our frequent blogs and social media posts.

## TECHNICAL SUPPORT AND HSE ACTIVITIES

The technical staff helped with sampling and caught up with the sample analysis backlog, worked on technical reports, and completed several maintenance projects.

### Laboratory Systems

We continued investigating issues with the paleomagnetic data. Using carefully fabricated standards, we verified that the JR6 and new SRM software are in agreement. However, during bench testing of the FlexIt and IceField tools, it was noticed that when the tools are physically rotated in the same direction, the values increase in one tool and decrease in the other. We plan to test the tools on the rig floor with the APC assembly, which will allow us to validate the relationship of the double line to the orientation tool's tool face and to determine the magnitude of the rotational mechanical error. Progress was also made in verifying that all 24 possible discrete sample orientations are being mapped correctly to the IODP reference frame in the new SRM software. We optimized the core description software (DESClogik), which dramatically improved the speed of loading templates and downloading data. We performed maintenance on the second hydraulic pump in the Chemistry Laboratory and are investigating the source of rainwater in the exhaust hood. While docked in Singapore, we removed part of the forward wall in the splitting room to reach the inspection hatch, which was opened and inspected, but no sign of water damage or water egress was seen. The floors of the hazardous and flammable lockers where cleaned and repainted. Finally, staff participated in training on our online purchasing software (AMS).

### HSE Activities

We held the weekly fire and abandon boat drill on 11 September, and tested the eye wash stations and showers.